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## Original article

# Utilisation of outcome measures in the management of non-specific neck pain: A national survey of current physiotherapy practice in the UK

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## Abstract

**Background:** Routine utilisation of outcome measures (OMs) is an integral part of physiotherapy rehabilitation when managing non-specific neck pain (NSNP). Numerous relevant OMs exist; however, the extent to which OMs are used by physiotherapists in the UK for NSNP is unknown.

**Objective:** To determine current utilisation patterns of OMs in UK physiotherapy practice when managing NSNP.

**Methods:** An online web-based survey instrument was developed and physiotherapists were invited to participate if they were currently practicing in the UK and had some experience of managing patients with neck pain. Logistic regression analyses using the generalised linear models was carried out to identify characteristics associated with OMs utilisation.

**Results:** A total of 2101 surveys were completed. One-third of the respondents reported not using OMs when managing NSNP. Lack of time and clear guidance about the suitability of available OMs were the most commonly reported reasons. A majority of the two-thirds of those who reported using OMs were consistently using pain and range of motion rating measures. Physical/functional limitations, psychological distress, and quality of life constructs, which are frequently associated with NSNP, were rarely measured. Years of practice ( $p = 0.000$ ), nation ( $p = 0.019$ ) and proportion of patients with neck pain ( $p = 0.034$ ) variables were found to be independently associated with frequent use of OMs.

**Conclusion:** This survey established the poor integration of OMs in the UK when managing NSNP. Further attention is required to identify or develop OMs which are feasible for use in busy clinical practice and to market them more effectively to physiotherapists.

Keywords:

Health; Survey; Neck-Pain; Outcome-Measures

## 1. Background

Outcome measures (OMs) are instruments utilised to establish the presence of a condition and accurately measure its severity (Nelson and Berwick, 1989; Fitzpatrick et al., 1998; Duckworth, 1999). Moreover, these instruments must have the ability to detect and quantify change in the construct of interest, over time, during and after rehabilitation (de Vet et al., 2011). Clinically, OMs are used for a variety of purposes. First, before intervention for diagnosis and prognostic purposes to allow classification of patients into meaningful subgroups and setting of treatment goals (Lansky et al., 1992; Kramer et al., 2006). Second, during intervention to monitor condition progression, detect change and facilitate communication with patients and other healthcare professionals (Greenslade et al., 2004; Bot et al., 2005; Nordin et al., 2009). Finally, after intervention to determine the effectiveness, efficiency and cost-effectiveness of the given intervention (CSP, 2012). OMs are categorised, in this study, as being either Patient-Reported Outcome Measures (PROMs), which evaluate an individual's perception regarding their condition or general health perception (Rabin and de Charro, 2001; Patrick and Deyo, 1989), or Performance-Based Outcome Measures (PBOMs), which use tools and/or physical tasks in clinical setting to quantify that individual's functional capacity (de Vet et al., 2011).

Routine utilisation of standardised OMs is an integral part of physiotherapy rehabilitation and is widely considered to facilitate evidence-based practice (Hammond, 2000; Glasziou et al., 2005; Verheyden and Meyer, 2016). Clinical guidelines and professional bodies explicitly recommended the routine utilisation of standardised OMs wherever practicable (CSP, 2012; HCPC, 2013; AOTA, 2015). They assert that physiotherapists must be able to collect and document qualitative and quantitative data regarding their patient's condition by using standardised OMs. This is to assure the quality of clinical practice by meeting the patient need, demonstrating the importance of physiotherapy and enabling physiotherapists to establish their effectiveness and cost-effectiveness (HCPC, 2013). However, accumulated evidence from studies conducted around the world reveals poor integration of standardised OMs in physiotherapy practice across range of settings (Jette et al., 2009; Swinkels et al., 2011; Wedge et al., 2012; Braun et al., 2018). Disparate data collection procedures and multiple barriers have been frequently reported to impede OMs utilisation (Copeland et al., 2008; Duncan and Murray, 2012; Diermayr et al., 2015).

Non-specific neck pain (NSNP) is a common and costly musculoskeletal problem that can cause pain, motor weakness, sensory deficit and impairments in the neck and upper limbs (Walker-Bone et al., 2003; Falla et al., 2004; Frank et al., 2005). These impairments are frequently associated with constructs such as functional limitations, psychological distress and reduced quality of life; consequently, causing work absenteeism and loss of productive capacity (Bot et al., 2007; Jull et al., 2008; Cote et al., 2008). To optimise conservative management of NSNP, physiotherapists need to understand the extent to which these constructs affect patient's daily activity, quality of life and work (McLean et al., 2007; Feleus et al., 2008). This requires ongoing evaluation using standardised OMs for NSNP and its associated disabilities (McLean et al., 2011; Osborn and Jull, 2013). Although numerous neck and upper limbs related OMs exist (Alreni et al., 2017; Bobos et al., 2018, 2019), the extent to which they are clinically utilised in the management of NSNP in the UK is unknown. Hence, the aim of this study was to describe current utilisation patterns of OMs during the management of patients with NSNP.

## 2. Methods

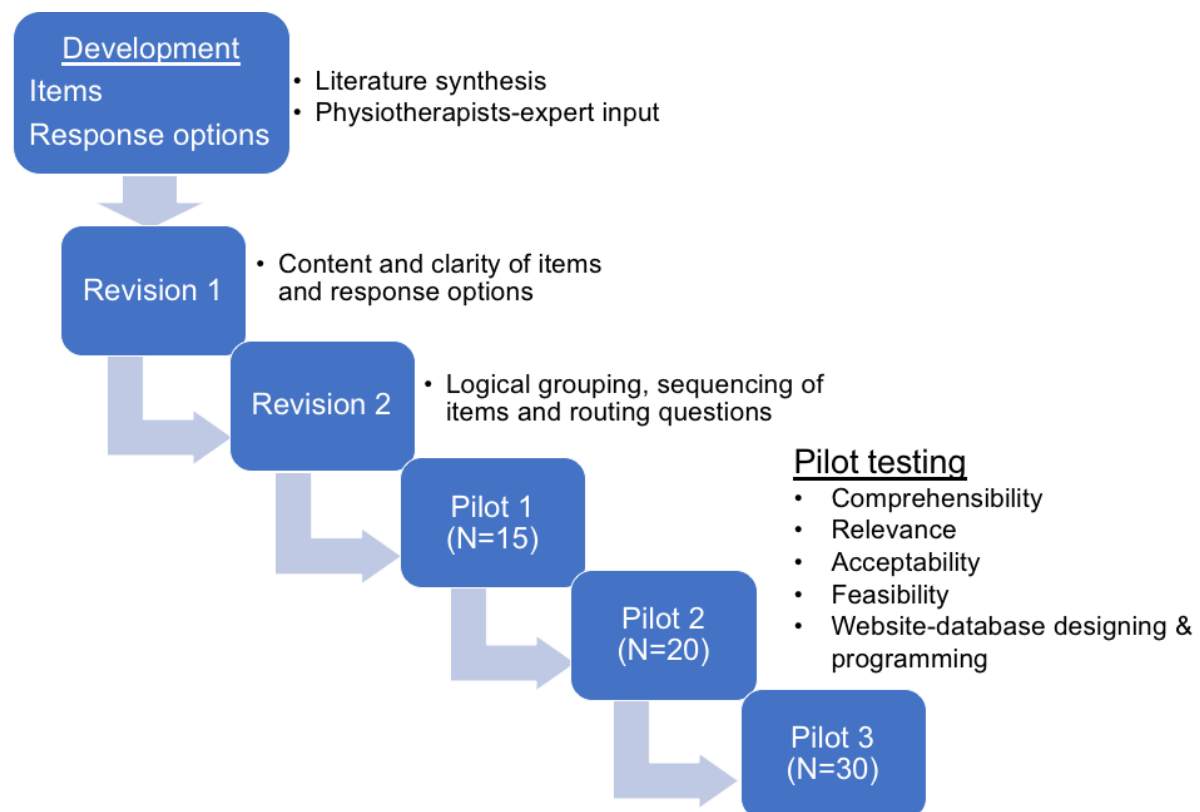
### 2.1 Design

An online web-based cross-sectional national survey of OMs utilisation was undertaken from March 2016 to November 2016. This survey was conducted as a part of a larger research project, which investigated the clinical management of NSNP and its associated disabilities. An anonymous survey was developed with reference to recent systematic reviews and comparable surveys (Babbie, 1998; Black et al., 1998). A web-page was designed to host the final version of the survey instrument and its associated database (Crawford et al., 2005). Physiotherapists were requested to participate in this survey if they were currently practicing in the UK and had some experience of managing patients with neck pain. The eligibility decision was left to the discretion of the participants and consent was assumed by participants deciding to complete the online survey (Fan and Yan, 2010). The survey was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement for cross sectional studies (von Elm et al., 2007).

### 2.2 Survey instrument (Development and Validation)

Fig. 1 shows the processes used during the development of the survey instrument. Survey structure and content were informed by a review of current evidence, including systematic reviews (Pietrobon et al., 2002; Schellingerhout et al., 2012; Alreni et al., 2017) and comparable surveys of OMs utilisation (Torenbeek et al., 2001; Haigh et al., 2001; Abrams et al., 2006; MacDermid et al., 2013). Identified OMs were collated, then grouped thematically to represent the spectrum of measures used to evaluate neck pain and its associated disabilities (i.e. 1. PROMs such as pain, physical functioning, work status, psychological distress, quality of life, and 2. PBOMs such as pain threshold perception, motion, muscle function and functional performance). This literature synthesis was used to formulate the first set of items and response options. A total of 4 drafts of the survey instrument were developed and distributed to and commented upon by UK experts/clinical physiotherapists and then field tested by physiotherapists from the target population. Subsequently, the final, fifth version was agreed upon and mounted online using the designed web-page.

The survey instrument underwent two rounds of revisions and three rounds of pilot testing (Babbie, 1998; Black et al., 1998). Initial revisions emphasised the content and clarity of each individual item and response option to limit the chance of misunderstanding. The second revisions emphasised the logical grouping, sequencing of items and routing questions which enabled respondents to skip the portion of the survey which were not relevant to their practice. Pilot testing of the survey instrument was conducted in three phases (phase 1, n=15; phase 2, n=20; and phase 3, n=30) with experts and clinical physiotherapists (de Vet et al., 2011). Based on their feedback revisions were made regarding wording, clarification of response choices and expected duration of completion. Further, a clear definition for NSNP alongside definitions for PROMs and PBOMs, and examples for each instrument were included. This was to ensure that the survey is relevant, acceptable and feasible for all UK-based physiotherapists, and to ensure the functionality of the web-page design and programming (Crawford et al., 2005; Fan and Yan, 2010).



*Figure 1 Survey Instrument (Development Process)*

The final version of this survey addressed the OM's utilisation patterns at baseline and during the management of NSNP, aims of OM's utilisation, specific PROMs used and specific PBOMs used. This was launched with a routing question "do you use outcome measures in the assessment / management of patients with non-specific neck pain?" If respondents selected NO, they were asked to indicate their reasons for not utilising OM's and then routed to the end of the survey, where they were thanked for participating in the survey. Selecting YES triggered a number of questions and response options. They were requested to indicate their reasons for utilising OM's and the frequencies with which they use measures (i.e. routinely =>70% of cases, regularly=51-70% of cases, sometimes=11-50% of cases and rarely=<10% of cases). Respondents were subsequently requested to identify which PROMs and/or PBOMs they utilised most often and the patterns of their use (i.e. routinely=>70% of cases, regularly=11-70% of cases, rarely=1-10% of cases and never=0% of cases). Respondents were able to select as many measures as they use in order to identify which respondents were using multimodal measurement approaches (i.e. combinations of PROMs and PBOMs). Progress indicator was used at the bottom of each screen to inform respondents of their progress throughout the survey to prevent drop out (Jeavons, 1999). Closed questions which require an answer to continue through were used in this survey. However, respondents were able to identify any "other" PROMs and/or PBOMs that they used but which were not identified in the response option lists (Couper et al., 2001). The survey could be completed using any electronic device with internet access.

### 2.3 Sampling frame

The total population in this survey was defined as all UK-based physiotherapists. At the time of the survey there were 48611 Health and Care Professional Council (HCPC) registered physiotherapists ([HCPC, 2016](#)), more than 98% of these registrants are members of the Chartered Society of Physiotherapy (CSP). Approximately 60% of those work for the National Health Service (NHS) and the remaining 40% work in the other setting such as private clinics, private hospitals, military hospitals, sports clubs or teaching in higher education. Physiotherapists were eligible to participate in this survey if they were working in the UK, were currently working with musculoskeletal patients in any type of outpatients setting and have some experience of managing patients with neck pain. Physiotherapists working in areas such as intensive care, mental health, respiratory care, paediatrics, stroke services, elderly care, or inpatient settings were ineligible. The eligibility decision was left to the discretion of the participants.

### 2.4 Recruitment and administration

UK professional bodies such as the HCPC and the CSP do not allow access to their registrants for the purpose of recruiting participants to research projects or surveys. Consequently, at the present, a list for the UK physiotherapists is not available. Meanwhile, accessing physiotherapists through the NHS requires approval from each selected NHS Trust prior to the survey administration, which is time-consuming and therefore not considered feasible for a national survey. However, recruitment methods using internet and social media are increasingly prevalent in health and medical research and quickly emerging as an effective tool for information sharing and research surveys ([Ryan, 2013](#); [Hewson, 2014](#); [Frandsen et al., 2014](#); [Lane et al., 2015](#)). Internet and social media methods allow a flexible and dynamic approach to recruitment, by which strategies can be continually monitored, adjusted, and evaluated for effectiveness ([Ahern, 2005](#); [Benfield and Szlemko, 2006](#); [Woodfield et al., 2013](#)). Furthermore, they offer easy access, instant distribution, continuous data collection with coverage over a wide geographical area whilst reducing cost ([Ramo and Prochaska, 2012](#); [Ventola, 2014](#); [Child et al., 2014](#)). Hence, a multi-modal recruitment strategy incorporating internet and social media platforms ([McRobert et al., 2018](#)) was used in this survey to reach and recruit large and diverse pools of UK-based physiotherapists involved in the management of NSNP ([Khatri et al., 2015](#); [Frandsen et al., 2016](#)). The recruitment strategy used in Twitter, which accounted for > 90% of the survey data, will be reported in a future publication.

### 2.5 Data collection and analysis

A domain name “uk-neckpainsurve.com” and hosting web were purchased. A web-page and database were designed and programmed for the survey administration and data collection. The sampling approach in this survey which incorporated internet and social media strategies in the recruitment and administration meant that the number of potential respondents could not be reliably determined; consequently, it was not possible to estimate the response rate. However, the large sample size achieved (4.3% of the whole UK physiotherapy population) alongside reasonable similarity to those in the total population in demographics have facilitated generalisability of the results ([Ryan, 2013](#); [Ventola, 2014](#); [Couper, 2007](#)) and strengthened the validity of the analysis ([Morgan and Harmon, 1999](#); [Bethlehem, 2009](#); [Altman, 1991](#)).

At the end of the survey period, data were collated and transferred into Excel 2016 where data were checked and cleaned from errors. Subsequently, the data were transferred into a Statistical Package for the Social Science (SPSS) (IBM SPSS Statistical Software, version 27.0) for statistical analysis.

Descriptive statistics were used to summarise participants' responses to each question. Bivariate analysis using simple cross-tabulation and multi response cross-tabulation tests were used to identify frequencies for the survey items. Since OMs utilisation, which was dichotomised in the following categories: "Yes" for utilisation and "No" for non-utilisation, is a dependent variable that consists of count data; the participants' characteristics (i.e. gender, setting, years of practice, nation, postgraduate training, proportion of patients with neck pain, special interest in neck pain) are independent variables which can be measured on a nominal scale. Logistic regression analyses using the Generalised Linear Models – Poisson loglinear and Likelihood Ratio tests were carried out using the SPSS. This is to identify which of the participants characteristics have a statistically significant association with the utilisation patterns of OMs and estimate the effect. The Goodness of fit (deviance and Pearson  $X^2 = <1$ ) and the Omnibus test (Likelihood Ratio  $X^2$ ,  $p < 0.05$ ) were used to determine the model fit (Osborne, 2017; Payne et al., 2017; Field, 2018).

### 3 Results

#### 3.1 Demographic characteristics

In total, 2101 physiotherapists who were HCPC registrants, practicing in the UK and involved in managing NSNP completed the survey. The demographic characteristics of those physiotherapists are summarised in Table 1. Respondents were predominately female (57%), and primarily working, at least partially, within the NHS (70%). A substantial component (44%) had 6-10 years of experience and the largest subgroup practiced in England (67%). A slim majority were without postgraduate training (51%) and 44% of respondents had a caseload which included 25-50% patients with neck pain. During the analysis, respondents who reported working partially in the NHS were combined with those who reported working exclusively in the NHS; respondents who reported working in other settings were combined with those who reported working exclusively in non-NHS.

#### 3.2 Demographic characteristics distribution

Demographics of the survey sample alongside the total UK physiotherapy population are presented in Table 2. Comparisons indicated a slightly higher proportion of the study sample worked at least partly in the NHS (70%) and lower proportion of female physiotherapists (57%). The sample was more balanced across the four UK nations with fewer located in England (67%). Overall, whilst the sample does not perfectly reflect the HCPC figures, a clear consistency is evident with the majority working in the NHS, being female and practicing clinically in England.

Table 1  
Demographic characteristics of physiotherapists

Variables	N	%
Gender:		
Male	908	43
Female	1193	57
Setting:		
Exclusively in the NHS	1005	47.8
Exclusively in Non-NHS	628	29.9
Combination of NHS & Non-NHS	464	22.1
Other settings	4	0.2
Years of Practice:		
0-5 Years	313	15
6-10 Years	928	44
11-15 Years	395	19
15+ Years	465	22
Nation:		
England	1398	67
Scotland	297	14
Wales	285	13
Northern Ireland	121	6
Postgraduate Training:		
No	1077	51
Yes - PhD or MSc	829	40
Yes – PGCert or PGDip	195	9
Proportion of Patients with Neck Pain:		
<25%	881	42
25-50%	925	44
≥51%	295	14
Special Interest in Neck Pain:		
No	1367	65
Yes	734	35

NHS: National Health Services, PhD: Doctor of Philosophy, MSc: Master of Science, PGCert: Postgraduate Certificate, PGDip: Postgraduate Diploma

### 3.3 OMs Utilisation

OMs utilisation are presented in [Table 3](#). Usage of OMs in general was indicated by 65% of participants. Physiotherapists with < 5 years of clinical practice reported not using OMs. Conversely, the majority of male physiotherapists, those working in non-NHS settings, those with 6-15 years of clinical practice, those practicing in Scotland, those with a caseload which included ≥ 25% of patients with neck pain and those with no special interest in neck pain, reported “using OMs” when managing their patients with neck pain.

Table 2

Demographics of the survey population vs the UK physiotherapy population

Variables	Survey sample	UK (physiotherapy population)
Total number of physiotherapists	n= 2101	n= 48611
Setting: %		
NHS	70	60
Non-NHS	30	40
Gender: N (%)		
Female	1193 (57)	38012 (78)
Male	908 (43)	10596 (22)
Gender distribution in each nation		
England: N (%)		
Total population	1398 (67)	40455 (83)
Female	712 (51)	31375 (78)
Male	686 (49)	9080 (22)
Scotland: N (%)		
Total population	297 (14)	4198 (9)
Female	243 (82)	3515 (84)
Male	54 (18)	683 (16)
Wales: N (%)		
Total population	285 (14)	2189 (5)
Female	213 (75)	1706 (78)
Male	72 (25)	483 (22)
Northern Ireland (NI): N (%)		
Total population	121 (6)	1766 (4)
Female	25 (21)	1416 (80)
Male	96 (79)	350 (20)

NHS: National Health Services

### 3.4 Participants characteristics influencing OMs utilisation

**Table 4** presents the effects, Rate Ratio (RR) with 95% Confidence Interval (CI) and the statistical significance of the independent variables on OMs utilisation patterns. The findings of Goodness of fit (deviance value/df = 0.115, Pearson  $X^2$  value/df = 0.107) and Omnibus test (Likelihood Ratio  $X^2 = 73.123$ , df = 16,  $p = 0.000$ ) indicated the model fit. The variables gender ( $p = 0.261$ ), setting ( $p = 0.357$ ), postgraduate training ( $p = 0.283$ ) and special interest in neck pain ( $p = 0.303$ ) were not independently associated with frequent use of OMs, whereas the variables years of practice ( $p = 0.000$ ), nation ( $p = 0.019$ ) and proportion of patients with neck pain ( $p = 0.034$ ) were independently associated. This indicates that physiotherapists with 6-15 years of clinical practice, those practicing in Scotland, those treating a higher proportion of patients with neck pain were more likely to frequently utilise OMs for their patients with NSNP.

Table 3  
OMs Utilisation

Variables	‘Yes’ to using OMs 65% (n = 1371)	‘No’ to using OMs 35% (n = 730)
Gender:		
Male	70% (n = 636)	30% (n = 272)
Female	62% (n = 735)	38% (n = 458)
Setting:		
Exclusively in the NHS	59% (n = 592)	41% (n = 413)
Exclusively in Non-NHS	73% (n = 458)	27% (n = 170)
Combination of NHS & Non-NHS	68% (n = 317)	32% (n = 147)
Other Setting	100.0% (n = 4)	0.0% (n = 0)
Years of practice:		
0-5 Years	0.0% (n = 0)	100.0% (n = 77)
6-10 Years	80% (n = 190)	20% (n = 46)
11-15 Years	71% (n = 658)	29% (n = 270)
15+ Years	44% (n = 175)	56% (n = 220)
Nation:		
Scotland	75% (n = 348)	25% (n = 117)
Northern Ireland	57% (n = 170)	43% (n = 127)
Wales	41% (n = 49)	59% (n = 72)
England	41% (n = 117)	59% (n = 168)
Postgraduate training:		
No	74% (n = 1035)	26% (n = 363)
Yes	67% (n = 722)	33% (n = 355)
Proportion of patients with NP:		
<25%	63% (n = 649)	37% (n = 375)
25-50%	72% (n = 635)	28% (n = 246)
≥51%	63% (n = 585)	37% (n = 340)
Special interest in NP:		
No	72% (n = 982)	28% (n = 385)
Yes	47% (n = 345)	53% (n = 389)

OMs: Outcome Measures, NHS: National Health Services, NP: Neck Pain

### 3.5 Physiotherapists’ reported reasons for utilising OMs

The reasons cited for utilising OMs are summarised in [Table 5](#). Two-thirds (n=1371) of respondents in this survey reported reasons for utilising OMs. The reasons were variable with setting treatment goals being the most prevalent. Communicating with patient, fulfilling charting/documentation standards and communicating with other healthcare professionals were also commonly reported reasons for utilising OMs. However, research, marketing and other reasons were less commonly cited.

Table 4  
Participants characteristics effects on OMs utilisation

Variables	Adjusted RR 95% CI			<i>p</i> -value
	RR	Lower	Upper	
Gender:				
Male	1.050	0.965	1.143	0.261
Female	1	0	0	
Setting:				
Exclusively in the NHS	0.789	0.419	1.740	0.357
Exclusively in Non-NHS	0.841	0.445	1.856	
Combination of NHS & Non-NHS	0.780	0.413	1.722	
Other Setting	1	0	0	
Years of practice:				
0-5 Years	0.540	0.406	0.711	0.000*
6-10 Years	1.025	0.886	1.185	
11-15 Years	0.990	0.893	1.097	
15+ Years	0.884	0.786	0.994	
Nation:				
Scotland	1.009	0.895	1.136	0.019*
Northern Ireland	0.890	0.750	1.049	
Wales	0.848	0.753	0.952	
England	1	0	0	
Postgraduate training:				
No	1.046	0.964	1.135	0.283
Yes	1	0	0	
Proportion of patients with NP:				
<25%	1.1779	1.157	2.864	0.034*
25-50%	1.717	1.129	2.740	
≥51%	1.820	1.193	2.909	
Special interest in NP:				
No	1.058	0.951	1.177	0.303
Yes	1	0	0	

OMs: Outcome Measures, NHS: National Health Services, RR: Likelihood Rate Ratio, CI: Confidence Interval, NP: Neck Pain. Goodness of fit statistics: Deviance (value = 240.004, df = 2084, value/df = 0.115), Pearson  $X^2$  (value = 223.846, df = 2084, value/df = 0.107). Omnibus Test (Likelihood Ratio  $X^2$  = 73.123, df = 16, *p*-value = 0.000).

### 3.6 Physiotherapists' reported reasons for NOT utilising OMs

One-third (n=730) of physiotherapists in this survey reported that they did not utilise OMs when managing their patients with NSNP. The reported reasons are diverse, as shown in [Table 6](#). The most endorsed reasons were a lack of clear guidance about the suitability of available OMs and a lack of time. Lack of access to information/knowledge about OMs, there

is no need to use OMs, lack of resources (e.g. expensive to purchase) and other reasons were less commonly cited reasons.

Table 5

Reasons for utilising OMs 65% (n = 1371)

Reasons	Frequencies	Percentage of cases
Setting treatment goals	1106	81.2%
Communicating with patients	975	71.6%
Fulfilling charting/documentation standards	526	39.4%
Communicating with other healthcare professionals	508	37.3%
Medicolegal documentation requirement	268	19.7%
Research	157	11.5%
Other reasons*	74	5.4%
Marketing	48	3.5%

\*Other reasons include: Assessment of Treatment Progress = 3, Audit of Service Efficacy = 23, Monitoring Progression = 8, Prognosis = 35, Requirement Commissioners = 1, Sub-Groups, Better Patient Understanding = 1, No Reasons Mentioned = 3.

Table 6

Reasons for NOT utilising OMs 35% (n = 730)

Reasons	Frequencies	Percentage of cases
Lack of clear guidance about suitability of available OMs	579	82.1%
Lack of time	549	77.9%
Lack of access to information/knowledge about OMs	103	14.6%
There is no need to use OMs	88	12.5%
Lack of resources (e.g. expensive to purchase)	15	2.1%
Other Reasons	3	0.4%

Other Reasons: I feel that outcome measures fail to reflect patients=1, I have not looked into validity of specific measures=1.

### 3.7 PROMs Utilisation

**Table 7** present the utilisation patterns of PROMs. Of the 1371 respondents who were using OMs, 90% (n=1246) reported using a PROMs. Numeric pain rating scales were the most prevalent, whereas the physical function and quality of life measures were rarely used. The Visual Analogue Scale (VAS) was the most commonly used PROM with 37% of respondents using it routinely. Quality of life PROMs were less commonly used, with the Euroqol (EQ5D) being routinely used by 15% of respondents, whereas the WHO-Brief was routinely used by only 1% of respondents and the SF36/SF-12 were never routinely used. The majority of the respondents had never used physical function and psychological distress PROMs, with the Patient Specific Functional Scale (PSFS) being routinely used by 9% of respondents, followed by the Neck Disability Index (NDI) and the Disability of Arm, Shoulder and Hand (DASH/QuickDASH) which were used routinely by only 6% and 2% of respondents respectively.

Table 7  
PROMs Utilisation 59% (n = 1246)

Measures	Utilisation			
	Routinely >70%	Regularly 11-70%	Rarely 1-10%	Never 0%
Visual Analogue Scale (VAS)	36.9%	1.2%	3.4%	58.4%
Numeric Rating Scale (NRS)	18.4%	4.1%	0%	77.5%
Euroqol (EQ5D)	14.8%	3.4%	1.3%	80.5%
Patient Specific Functional Scale (PSFS)	9.2%	4.7%	3.8%	82.3%
Neck Disability Index (NDI)	5.9%	3.2%	5.9%	85%
Fear of Movement Scales	7.9%	3.3%	2.8%	86.0%
Time Lost from Work	3.5%	4.5%	1.6%	90.4%
Depression/Anxiety Scale	3.6%	1.1%	4.6%	90.7%
Disability of Arm, Shoulder and Hand (DASH)/QuickDASH)	2.3%	1.0%	5.0%	91.6%
Pain Catastrophizing Scale (PCS)	1.1%	3.5%	1.1%	94.2%
Patients Global Perceived Rating of Improvement or Satisfaction	3.5%	1.3%	0%	95.2%
Other PROM scales (Orebro)*	4.6%	0%	0%	95.4%
SF-36/SF12	0%	3.4%	1.1%	95.5%
Whiplash Disability Questionnaire	2.2%	0%	2.3%	95.5%
WHO-Brief	1.1%	0%	1.2%	97.7%
Bournemouth Questionnaire (BQ)	1.2%	0%	0%	98.8%
Neck and Upper Limb Index (NULI)	0%	1.2%	0%	98.8%
Pain Distress Scale	1.1%	0%	0%	98.9%
Northwick Park Neck Pain (NPQ)	0%	0%	0%	100%
Rapid Upper Limb Assessment (RULA)	0%	0%	0%	100%
Work Limitation Scale	0%	0%	0%	100%
Work Distress Scale	0%	0%	0%	100%
Nottingham Health Profile (NHP)	0%	0%	0%	100%

### 3.8 PBOMs Utilisation

Table 8 present the utilisation patterns of PBOMs. Of the 1371 respondents who were using OM, 46% (n=632) reported using a PBOM. The selection of measures was variable and mostly never used. Goniometric Measures of Neck Motion was the most commonly used measure with 19% of the respondents using it routinely, followed by the Rating of Segmental Joint Mobility which was used routinely by 8% of respondent. Quantitative Sensory Test (QST) were the most commonly used pain threshold perception test with 8% of respondents using it routinely, whereas the Pain Algometry was used routinely by 2% of respondents. The Neck Muscles Strength Test was the most prevalent muscle function test with 7% of respondents using it routinely, whereas Upper Extremity Muscle strength/Endurance tests were used by only 1% of respondents.

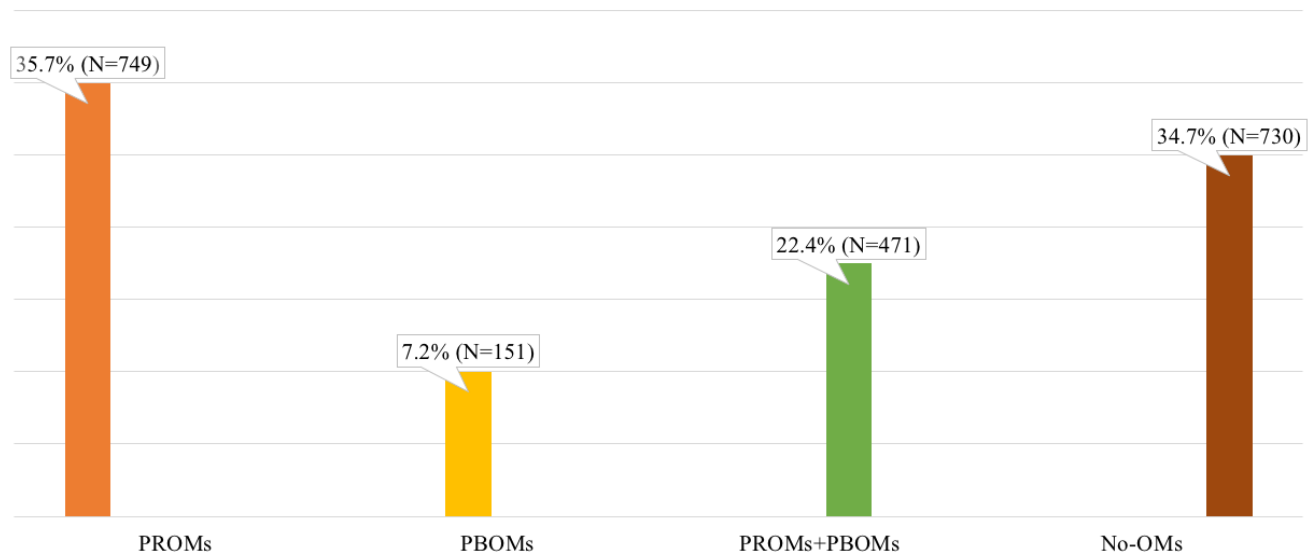
Table 8  
PBOMs Utilisation 30% (n = 632)

Measures	Utilisation			
	Routinely: >70%	Regularly: 11-70%	Rarely: 1-10%	Never: 0%
Goniometric Measure of Neck Motion	18.7%	1.1%	0%	80.2%
Quantitative Sensory Test (QST)	8.1%	3.3%	1.1%	87.4%
Rating of Segmental Joint Mobility	8.1%	3.4%	0%	88.4%
Neural dynamic testing	3.4%	5.8%	2.2%	88.6%
Neck Muscle Strength test	6.9%	3.5%	0%	89.6%
Neurological exam	6.8%	2.3%	0%	90.9%
Posture alignment measures	3.5%	4.5%	0%	92.0%
Proprioception test	1.1%	1.1%	4.7%	93.1%
Neck muscle endurance testing	2.3%	3.5%	0%	94.2%
Neck muscle stability testing	1.1%	2.3%	1.1%	95.4%
Pain Algometry	2.3%	1.1%	0%	96.6%
Upper extremity muscle strength/endurance	1.1%	1.1%	1.1%	96.6%
Movement Diagram	1.2%	1.1%	0%	97.7%
Functional performance tests	1.1%	1.1%	0%	97.8%
Inclinometer of Neck Motion	1.1%	0%	0%	98.9%
Functional capacity assessment	0%	0%	1.1%	98.9%
Other physical or functional measure/measures	0%	0%	0%	100%

### 3.9 Multimodal measurement approach (PROMs + PBOMs) Utilisation

Figure 2 present the utilisation patterns of the multimodal measurement approach. Of the 2101 responses achieved in this survey, 22% reported using multimodal measurement approach which is a combination of utilising PROMs and PBOMs. Meanwhile, 36% of respondents reported utilising various PROMs, whereas only 7% of respondents reported using PBOMs.

Figure 2: Utilisation of Multimodal Measurement Approach (N=2101)



PROMs: Patient-Reported Outcome Measures  
PBOMs: Performance-Based Outcome Measures  
OMs : Outcome Measures

## 4 Discussion

### 4.1 Summary and discussion of the main findings

The survey findings indicate that OMs are poorly incorporated in the management of NSNP by UK physiotherapists. A third of the respondents in this survey reported that they never utilise OMs when evaluating their patients with NSNP and lack of clear guidance about the suitability of available OMs and lack of time were the most commonly reported reasons. This conflicts with recommendations from clinical guidelines and professional bodies regarding OMs utilisation (CSP, 2012; HCPC, 2013; AOTA, 2015). However, many OMs require resources (e.g. time, pen and paper) and proficiency level in English for completion making them impractical for busy clinical practice (Duncan and Murray, 2012; Pattison et al., 2015). A majority of the two-third of physiotherapists who were utilising OMs reported that they would consistently use single dimensional numeric pain and range of motion (ROM) rating scales. Although these OMs are quick to use, these single dimensional scales are narrow parameters of NSNP and cannot capture information in relation to constructs such as physical function, psychological factors, social capacity and quality of life, which are frequently impacted by NSNP (Kyte et al., 2015). In addition, OMs to evaluate upper limb functional capacity such as the DASH were rarely utilised by physiotherapists in this survey. Given the relationship between NSNP and upper limb disability, with 80% of NSNP patients likely to present with upper limb disability, it is strongly recommended that physiotherapists should routinely evaluate upper limb functional capacity using a suitable OMs (McLean et al., 2011; Osborn and Jull, 2013; Alreni et al., 2020).

Clinically, limited utilisation of standardised OMs may contribute to inadequate evaluation of patients with NSNP (Nordin et al., 2009; Binder, 2007). Failure to adequately evaluate patients before an intervention may results in missing impairments that would classify patients into meaningful subgroups which would facilitate the clinical reasoning process and in turn tailor appropriate rehabilitation plans (Lansky et al., 1992; Rudd et al., 2000). Further, failure to make ongoing evaluation during rehabilitation could be a barrier to evaluating the effectiveness of the given intervention which may contribute to poor treatment outcomes and reduced quality of care (NHS, 2010; HCPC, 2013). This implies that routine utilisation of standardised OMs is important to facilitate optimal NSNP rehabilitation and quality of care (McLean et al., 2011; Osborn and Jull, 2013; Alreni et al., 2017). The findings of the current survey are consistent with comparative studies conducted across the globe regarding OMs utilisation patterns in musculoskeletal conditions including neck pain and low back pain (Jette et al., 2009; Braun et al., 2018; MacDermid et al., 2013; van Peppen et al., 2008). This indicates that the physiotherapy profession nationally and internationally may be falling short of Evidence-Based Practice recommendations with respect to implementing standardised OMs routinely in most clinical settings when managing NSNP and other musculoskeletal conditions (Jette et al., 2003).

One of the most common reasons for not utilising OMs related to lack of clear guidance about the suitability of available OMs. However, there are numerous systematic reviews investigating the measurement properties of available OMs for neck and upper limb disorders; and the CSP and NHS guidance provide information on available good quality OMs. This suggests that there is a gap in the utilisation and/or interpretation of available research by physiotherapists working in clinical environment. This may be due to ineffective or inefficient mechanisms of disseminating information through the professional literature. Dissemination through continuing education as well as continuing professional development

for physiotherapists may increase uptake of OMs. These should include all available methodologies to learning, such as training workshops, conferences and events, e-learning programmes, best practice techniques and ideas sharing, all focused to assist physiotherapists in making decisions about OMs.

#### 4.2 Strengths of the study

This study developed a survey instrument designed with the Web-Based Survey Design Standard (Crawford et al., 2005; Fan and Yan, 2010). The design incorporated advanced and iterative features that provided a dynamic and flexible survey process which facilitated the simplicity and brevity of the survey instrument; subsequently, this contributed to achieving fast and accurate data collection and analysis at very low cost (Benfield and Szlemko, 2006; Couper, 2007; Flanigan et al., 2008). Furthermore, the innovative and effective social media strategies that were used in the recruitment of participants and administration of the survey instrument potentially contributed to the large and diverse sample size (McRobert et al., 2018). Our sample of UK physiotherapists was broadly representative, compared with the total UK physiotherapy population, which maximised generalisability and strengthened validity of the results (Morgan and Harmon, 1999; Bethlehem, 2009; Altman, 1991). This is the first national survey to describe current UK physiotherapy practice regarding OMs utilisation patterns for NSNP.

#### 4.3 Limitations of the study

This online survey has several limitations. This survey will not have gained responses from physiotherapists who do not have access to or do not use the internet and/or social network sites. However, since use of internet and social network sites continues to increase worldwide and has become a fundamental vehicle in the navigation of everyday life, the majority of adults living in the UK now have access to the internet and regularly use social network sites (Ahmed et al., 2012; Thackeray et al., 2012; ONS, 2016). The non-probability sampling approach meant that there was no reliable way to determine potential participants, estimate the sample size or the true response rate; consequently, non-respondent bias may be present (Fan and Yan, 2010; Bosnjak et al., 2005). The survey did not explicitly distinguish between the use of PROMs and PBOMs at baseline and/or during the management plan. However, physiotherapists were requested to identify their general reasons for utilising OMs. An unavoidable limitation is that the survey captured the self-reported behaviour of the respondents rather than the actual behaviour, which may present social desirability bias (Black et al., 1998; Bosnjak et al., 2005). Furthermore, the survey findings provide a rough indicator of practice in the UK and may not reflect nuanced practice or decision-making process that inform practice. It is also possible that physiotherapists may have wanted further information to make informed clinical decisions regarding OMs utilisation. More in-depth qualitative studies would be required to support a survey of this nature in order to make those determinations. Nevertheless, the findings regarding OMs utilisation are consistent with other comparative neck, low back pain and other musculoskeletal conditions surveys conducted globally (Jette et al., 2009; MacDermid et al., 2013; Braun et al., 2018).

### 5 Conclusion

The findings of this survey suggest that physiotherapists in the UK appeared to be either not utilising OMs or utilising single dimensional pain or ROM rating scales when managing NSNP. There are variations by experience, nation and proportion of patients with neck pain;

and the reasons for poor OMs utilisation included lack of clear guidance about the suitability of available OMs and lack of time. Whilst there are numerous well validated OMs for NSNP which are suitable for use in research, they are often resource intensive making them less feasible for use in clinical practice. Further attention is required to identify or develop OMs which are feasible for use in busy clinical practice and market them more effectively to physiotherapists.

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### **Ethics**

Ethical approval was granted from the Health & Well-being Faculty Ethics Committee at Sheffield Hallam University (reference 2014-5/ HWB-HSC-13).

### **Declaration of competing interest**

None declared.

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